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10/779,365	02/13/2004	Timothy D. Flynn	BFM-02501	7888

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EXAMINER
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HIRL, JOSEPH P

ART UNIT	PAPER NUMBER
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2129

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/08/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/779,365

Applicant(s)

FLYNN ET AL.

Examiner

Joseph P. Hirl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-107 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-107 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This Office Action is in response to an AMENDMENT entered November 16, 2006 for the patent application 10/779,365 filed on February 13, 2004.
2. The First Office Action of July 14, 2006 is fully incorporated into this Final Office Action by reference.

### ***Status of Claims***

3. Claims 1-107 are pending in this application.

### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-107 Neural networks require either supervised or unsupervised training related to the field of application. Without such training, the network is not capable of effectively functioning and has no utility.

Claims 1-37; 52-53; 57; 60-93; 104, 105 neural networks are not trained and are non functional.

Claim 58, 59 is trained offline but there is no indication of the relevance of the training.

Unless functional related values are input to the Kalman filter and the Kalman filter is appropriately derived, determination of weight cannot be made ... invention has not utility.

Claims 38-51; 54-56; 94, 95, 103, 106 and 107 identify the use of the Kayman filter algorithm but without proper condition of such algorithm, the claim is functionless or has no utility.

6. Claims 38-51; 54, 55; 94-103; 106 and 107 invite the use of data that is not relevant to the subject invention which render the claims ineffective or lacking utility.

7. Claims 35 and 91 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. When tanh is zero, the sensitivity is not effective.

### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-107 are rejected under 35 USC 112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a 101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application. This is how the MPEP puts it:

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("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35U.S.C. 101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. 101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. § 112."); In re Kirk, '376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, **otherwise an applicant would anomalously be required to teach how to use a useless invention.**"). See, MPEP 21107.01 (IV), quoting In re Kirk (emphasis added).

Therefore, claims 1-107 are rejected on this basis.

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claim 1-15, 17-37, 48-93, 104 and 107 are rejected under 35 U.S.C. 102(b) as being anticipated by McCool et al (USPN 5,987,397, referred to as **McCool**).

Examiner's Note (EN): Person having ordinary skill in the art (PHOSITA) would know and understand "Elements of Artificial Neural Networks" by Kishab Mehrotra et al." The reference by McCool has its basis in this neural network technology (MPEP 2112).

### **Claims 1, 52, 57, 104, 107**

McCool anticipates determining a flight regime in accordance with one or more inputs, said flight regime of the aircraft being associated with a flight state of the aircraft based on said one of more inputs (**McCool**, c1:35-52; EN: flight regime criteria does not limit the claim ... all flight regimes have flight states based on parameters); selecting a neural net in accordance with said flight regime (**McCool**, c1:35-52); and determining

said weight using said neural net (**McCool**, c 1:35-52; EN: ¶ 34. applies; flight regime is interpreted without limitations).

**Claims 2, 53, 58**

McCool anticipates said neural net is trained offline prior to determining said weight of said aircraft (**McCool**, c1:35-52; EN: weight is developed from input data which is of the unprocessed form).

**Claims 3, 59**

McCool anticipates said determining said weight of said aircraft is performed during operation of said aircraft (**McCool**, c1:35-52; EN: real time meaning performance of the aircraft).

**Claims 4, 60**

McCool anticipates neural net is one of a plurality of neural nets (**McCool**, c1:35-52; EN: plurality occurs during training/learning).

**Claims 5, 61**

McCool anticipates the neural net is a feedforward neural net (**McCool**, c1:35-52; EN: such is a standard neural network).

**Claims 6, 62**

McCool anticipates neural net includes a single hidden layer (**McCool**, c3:8-40; EN: PHOSITA anticipates hidden layer configuration).

**Claims 7, 63**

McCool anticipates said neural net has a same set of interconnections between each neuron in said hidden layer and an input layer, and a same set of interconnection

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between said each neuron and an output layer (**McCool**, c 3:8-40; EN: PHOSITA anticipates such a standard network configuration).

**Claims 8, 64**

McCool anticipates each of said neurons in said hidden layer utilizes a same sigmoidal activation function (**McCool**, c3:8-40; EN: PHOSITA anticipates a step or sigmoidal activation function).

**Claims 9, 65**

McCool anticipates said neural net includes between 20 and 35 neurons in said hidden layer (**McCool**, c2:32-67; EN: PHOSITA anticipates input data defines hidden layer neurons).

**Claims 10, 66**

McCool anticipates said weight is used as an input to another process (**McCool**, c2:32-67; EN: for the purpose of generalization).

**Claims 11, 67**

McCool anticipates the flight regime is one of a plurality of flight regimes that are mutually exclusive from one another (**McCool**, c2:32-67; c3:1-7).

**Claims 12, 68**

McCool anticipates the flight regime is manually selected (**McCool**, c2:32-67; c3:1-7; EN: aircraft is human operated).

**Claims 13, 69**

McCool anticipates the flight regime is an effective flight regime including one or more actual flight regimes using the same set of one or more neural nets (**McCool**, c2:32-67; c3:1-7).

**Claims 14, 70, 105**

McCool anticipates one or more neural net inputs are used as inputs to said neural net selected, and the one or more neural net inputs include at least one derived parameter that is determined based on mathematical and physical relationships of measured data (**McCool**, c2:32-67; c3:1-7; Fig. 2).

**Claims 15, 71**

McCool anticipates the one or more neural net inputs are a first number of derived parameters determined using a second number of raw data values, the second number being greater than said first number (**McCool**, c2:32-67; c3:1-7; Fig. 2; EN: such would be increase in the rate of climb).

**Claims 17, 73**

McCool anticipates neural net inputs include roll attitude and pitch attitude in accordance with the selected flight regime (**McCool**, c2:32-67; c3:1-7).

**Claims 18, 74**

McCool anticipates neural net inputs is a derived parameter based on at least one of roll attitude and pitch attitude in accordance with the 20 selected flight regime(**McCool**, c2:32-67; c3:1-7; EN: such will occur in the training mode).



**Claims 19, 75**

McCool anticipates neural net is included in a gross weight processor (**McCool**, c2:32-67; c3:1-7; Figs. 1 & 2).

**Claims 20, 76**

McCool anticipates the gross weight processor is included on the aircraft for which said weight is determined

**Claims 21, 77**

McCool anticipates the gross weight processor is included at a ground location and communicates with said aircraft (**McCool**, c2:32-67; c3:1-7; Figs. 1 & 2).

**Claims 22, 78**

McCool anticipates the one or more inputs include at least one of: a sensor measurement, manual input, data from a storage location (sensors will determine the various inputs).

**Claims 23, 79**

McCool anticipates determining said flight regime as a hover flight regime in accordance with the following input parameters: landing flag, takeoff flag, weight on wheels, yaw rate, rate of climb, pitch attitude, roll attitude, drift velocity, ground speed, airspeed, and control reversal flag, wherein said landing flag indicates whether said aircraft is landing, said takeoff flag indicates whether said aircraft is in takeoff mode, and said control reversal flag indicates whether said aircraft is in a reversal mode (**McCool**, c2:32-67; c3:1-7; EN: other input includes that which is related to flight operations.

**Claims 24, 26, 27, 30, 80, 82, 83, 86**

McCool anticipates said landing flag indicates no landing, said takeoff flag indicates no takeoff, said weight on wheels indicates no weight on wheels, said control reversal flag indicates that said aircraft is not in reversal mode, said yaw rate has an approximate value within the inclusive range of  $-2.5 \leq \text{yaw rate} \leq 2.5$  degrees/second, said pitch attitude is within the inclusive range of:  $-10 \leq \text{pitch angle} \leq 10$  degrees, said rate of climb is approximately within the inclusive range of:  $-500 \leq \text{rate of climb} \leq 500$  feet/minute, said roll attitude approximates a value within the inclusive range of:  $-6 \leq \text{roll attitude} \leq 3$  degrees, said drift velocity approximates a value within the inclusive range of:  $-7 \leq \text{drift velocity} \leq 7$ , said ground speed approximates a value within the inclusive range of:  $-7 \leq \text{ground speed} \leq 7$  knots, said airspeed is an approximate value less than or equal to 38 knots. (McCool, c2:32-67; c3:1-7; Figs. 1 & 2; EN: the various values are covered under the plurality of measurements associated with the various units; various operations do not change the functionality of the disclosed methodology).

**Claims 25, 28, 31, 81, 84, 87**

McCool anticipates determining that said aircraft is in a hover flight regime at a first point in time; and determining that said aircraft remains in said hover flight regime at a second later point in time if said airspeed at said second later point in time does not exceed 43 knots (McCool, c2:32-67; c3:1-7; Figs. 1 & 2; EN: the various values and operations are covered under the plurality of measurements associated with the various units).

**Claims 29, 85**

McCool anticipates determining said flight regime as a turn flight regime in accordance with the following input parameters: landing flag, takeoff flag, weight on wheels, roll attitude, airspeed, and rate of climb, wherein said landing flag indicates whether said aircraft is landing and said takeoff flag indicates whether said aircraft is in takeoff mode (**McCool**, c2:32-67; c3:1-7; Figs. 1 & 2; EN: the various values and operations are covered under the plurality of measurements associated with the various units).

**Claims 32, 88**

McCool anticipates one or more inputs are scaled within a predetermined range (**McCool**, c2:32-67; c3:1-7; Figs. 1 & 2; EN: such are inflight measurement of variable input parameters).

**Claims 33, 89**

McCool anticipates determining a sensitivity of said weight with respect to a parameter used in determining said weight (**McCool**, c2:32-67; c3:1-7; Figs. 1 & 2; EN: such is correlation of actual to estimated weight).

**Claims 34, 90**

McCool anticipates said sensitivity of said weight with respect to said parameter is determined in accordance with a partial derivative of said weight with respect to said parameter (**McCool**, c2:32-67; c3:1-7; Fig. 3; EN: such is the slope of the related figure).

**Claims 35, 91**

McCool anticipates weight is determined using a neural network and represented by the equation identified in claim 35 (**McCool**, c2:32-67; c3:1-40; EN: equation is of the standard form used by POSITA).

**Claims 36, 37, 92, 93**

McCool anticipates neural network is a feedforward neural net with one hidden layer containing p sigmoidal neurons and the sensitivity is represented by the equation identified in claim 36 ) (**McCool**, c2:32-67; c3:1-40; Fig. 3; EN: the slope of the line represents the partial derivative relative to actual gross weight).

**Claims 48, 56**

Smith anticipates a regime recognizer that determines a regime indicator in accordance with a portion of said one or more inputs, said flight regime indicator indicating a flight regime associated with a flight state of the aircraft based on said portion of one or more inputs (**McCool**, c2:32-67; EN: regime is merely characteristics related input data); and a gross weight estimator that determines said weight of said aircraft, said gross weight estimator including at least one of a Kalman filter, and one or more neural nets, and using at least one of said Kalman filter and a first of said one or more neural nets in determining said weight (**McCool**, c2:32-67).

**Claim 49**

Smith anticipates an input processor that processes one or more inputs producing one or more processed inputs, said one or more inputs including at least one sensor measurement (**McCool**, c2:32-67; Fig. 2); and a portion of said one or more

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processed inputs are neural net inputs used by said one or more neural nets, and said gross weight estimator including: a neural net selector that selects a neural net in accordance with said regime indicator (**McCool**, c2:32-67; Fig. 2: EN: ¶ 34 applies; regime is merely characteristics related input data).

**Claim 50**

Smith anticipates regime recognizer is included in said input processor (**McCool**, Fig. 1).

**Claim 51**

Smith anticipates gross weight estimator includes one or more neural nets whose output, when said one or more neural nets is selected in accordance with said flight regime indicator, is an input to said Kalman filter (**McCool**, c1:35-52; EN: ¶ 34 applies; regime is merely characteristics related input data; Kalman filter is not apart of this process since it was not required in claim 48).

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 38-47, 54-55, 94-103 and 106 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al (USPN 5,606,505, referred to as **Smith**).

**Claims 38, 54, 94, 106**

Smith anticipates receiving one or more values (**Smith**, Fig. 1); and determining said weight using a Kalman filter wherein said one or more values are used as inputs to said Kalman filter and said Kalman filter produces the weight as an output (**Smith**, Figs. 1, 2; EN: such weights are incorporated to determine the related Taylor series expansion).

**Claims 39, 55, 95**

Smith anticipates one or more measurements are input to said Kalman filter, and the method further comprising: determining a flight regime in accordance with one or more regime measurements, said flight regime of the aircraft being associated with a flight state of the aircraft based on said one or more regime measurements (**Smith**, c3:33-63; EN: flight regime criteria does not limit the claim ... all flight regimes have flight states based on parameters); selecting a function based on said flight regime (**Smith**, c3:33-63); and determining a covariance associated with one of said measurements in accordance with said function (**Smith**, c3:33-63).

**Claims 40, 96**

Smith anticipates hover flight regime, and said function determines said covariance associated with a weight estimate (**Smith**, c3:33-63; EN: ¶ 34 applies; hover merely means to remain in the vicinity and then any fixed wing aircraft qualifies).

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**Claims 41, 97**

Smith anticipates function determines said covariance in accordance with body accelerations of said aircraft along x and z axes, roll attitude, pitch attitude, airspeed and altitude (**Smith**, c7:64-67; c8:1-12).

**Claims 42, 98**

Smith anticipates one or more measurements are input to said Kalman filter, said one or more measurements including at least one of: a weight estimate, and engine fuel flow rate (**Smith**, c3: 33-63).

**Claims 43, 99**

Smith anticipates weight estimate is a predetermined value based on vehicle flight and performance data (**Smith**, c8: 24-37).

**Claims 44, 100**

Smith anticipates weight estimate is based on manually entered data representing a sum gross weight of said aircraft (**Smith**, c8: 24-37).

**Claims 45, 101**

Smith anticipates flight regime is manually determined (**Smith**, c18: 7-37).

**Claims 46, 102**

Smith anticipates flight regime is determined in accordance with a predetermined mapping that maps one or more values to a particular flight regime, wherein a given set of one or more inputs values uniquely maps to a flight regime (**Smith**, c3: 33-63; EN: such is the learning process).

**Claims 47, 103**

Smith anticipates Kalman filter produces an output used as an input to another component (Smith, Fig. 1).

***Response to Arguments***

14. The objections to the specifications are withdrawn.

15. In reference to Applicant's argument:

In connection with numbered paragraph 4 on page 3 of the Office Action, Applicant is unclear as to the relevance of this paragraph. Paragraph 4 does not set forth a rejection but appears rather as a commentary. Paragraph 4 states that neural networks require training and without such training, the network is not capable of functioning. With respect to the foregoing as related to neural networks, it is known in the art that some form of training is needed. Neural networks and associated training are also discussed in numerous locations throughout Applicant's specification, for example, in Figure 13 and the specification at page 56, line 7-page 59, line 7, page 67, line 5-page 72, line 18. Paragraph 4 also states that: "Unless functional related values are input to the Kalman filter and such Kalman filter is appropriately derived, determination of weight cannot be made." Applicant is unclear what the foregoing citation in the Office Action is suggesting with respect to Claims 1-107 particularly since not all the claims recite a Kalman filter (see, for example, Claims 1-37).

Examiner's response:

¶ 34. applies. The claims and only the claims form the metes and bounds of the invention. Limitations appearing in the specification but not recited in the claim are not read into the claim. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. To a person having ordinary skill in the art (PHOSITA), the statements of paragraph 4 are entirely clear and with a review of the identified claims the concern is obvious. As a example in claim one, if the neural nets have not been trained, the selecting of the neural net is inconsequential because the result will be inclusive. Regarding the Kalman filters, and using claim 54 as an example, the input



values could be related to a tank and hence the output of the Kalman filters will have no utility in the determination of a weight of an aircraft.

16. The rejection of claims 57-107 under 35 USC 101 related to computer programs per se is withdrawn.

17. The rejection of claims 16 and 72 rejected under 35 USC 101 related to the concern of  $\phi$  near or equal to zero is withdrawn.

18. In reference to Applicant's argument:

The rejection of Claim 35 and 91 under 35 USC 101 as lacking patentable utility is hereby traversed and reconsideration thereof is respectfully requested. Paragraph 7 of the Office Action states that when  $\tanh$  is zero, the sensitivity is ineffective. Applicant respectfully submits that Claims 35 and 91 do not recite "sensitivity" as a claim element. Sensitivity is recited as an element in connection with other claims, such as, for example, Claim 36. The values for  $\tanh$ , including when  $\tanh=0$ , used in connection with the elements recited in Claims 35 and 91 do not render Claims 35 and 91 as lacking patentable utility. In view of the foregoing, Applicant respectfully requests that the rejection be reconsidered and withdrawn.

Examiner's response:

Applicant is invited to review claim 34 from which claim 35 depends to understand the concern for "sensitivity."

19. The rejection of claims 36 and 92 under 35 USC 101 related to  $\cosh^2$  is withdrawn.

20. The rejection of claims 35, 36, 37, 91, 92, and 93 under 35 USC 101 related to patentable utility and partial derivatives are withdrawn.

21. In reference to Applicant's argument:

The rejection of Claims 1-107 under 35 U.S.C. § 112, T1 is hereby traversed and reconsideration thereof is respectfully requested. The Office Action states that this rejection is made due to a previously cited rejection of Claims 1-107 under 35 U.S.C. 101. Applicant respectfully submits that although Claims 16, 35-37, 72, 91-93, and 57-107 are rejected under 35 U.S.C. 101 in the Office Action, nowhere in the Office Action do the remaining claims appear to be rejected under 35 U.S.C. 101. Applicant respectfully submits that the rejection of Claims 16, 35-37, 72, 91-93, and 57-107 under 35 USC 112, first paragraph, based on the previous 101 rejection, has been addressed by the amendments and remarks made herein as set forth above in connection with the previous 101 rejections. Applicant respectfully submits that there appears to be no basis for the rejection of the remaining claims with respect to a previous 101 rejection.

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Examiner's response:

Please refer to the above comments to include the specific rejections of ¶ 4.

22. The rejections of claims 1, 11, 13, 17, 23, 25, 26, 28, 29, 31, 39, 40, 41, 52, 55, 56, 79, 81, 82, 84, 85, 95, 96, 101, 102, and 104 under 35 USC 112, second paragraph are withdrawn.

23. In reference to Applicant's argument:

Claim 1, as amended herein, is neither disclosed nor suggested by McCool in that McCool neither discloses nor suggests a method for determining a weight of an aircraft comprising: determining a flight regime in accordance with one or more inputs, said flight regime of the aircraft being associated with a flight state of the aircraft based on said one of more inputs; selecting a neural net in accordance with said flight regime; and determining said weight using said neural net, as set forth in Claim 1.

As support for each of the foregoing recited steps of Claim 1, the Office Action at page 5 relies on Col. 1, Lines 35-52 of McCool. This citation of McCool is pointed out above. Applicant respectfully submits that this citation of McCool appears silent regarding determining a flight regime associated with the flight state of the aircraft based on one or more inputs. Furthermore, this citation of McCool is also silent with respect to selecting a neural net based on the flight regime and using this neural net to determine the weight of the aircraft.

McCool discloses operating his system 10 during a first hover maneuver or hover flight conditions and making an initial estimate regarding the gross weight and center of gravity. (See, for example, Col. 2, Lines 53-66; step 40 of Figure 2; Col. 3, Lines 30-33). The initial calculations regarding gross weight and center of gravity are updated using the fuel information to determine the desired real-time gross weight and center of gravity location output. (See Figure 4, step 44, Col. 3, Lines 35-37). Applicant notes that McCool does not disclose how a determination is made as to when the helicopter is in a first hover maneuver or hover flight condition and therefore neither discloses nor suggests Applicant's determining step of amended Claim 1. McCool also makes no disclosure or suggestion of selecting a neural net in accordance with a flight regime. McCool teaches a methodology in which the neural net is only trained in hover flight conditions. Accordingly, McCool cannot possibly teach or disclose selecting a neural net in accordance with a flight regime when McCool's neural net is only operative under hover flight conditions. Furthermore, as set forth in the processing step of Figure 2, there is no selection step for selecting a neural network in accordance with a flight regime.

Examiner's response:

¶ 34. applies. The claims and only the claims form the metes and bounds of the invention. Limitations appearing in the specification but not recited in the claim are not read into the claim. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. A flight regime of the aircraft that is associated with a flight state of

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the aircraft that is based on parameters or inputs is an axiomatic statement. PHOSITA knows that given a flight regime, such regime has a flight state based on parameters. How else in the engineering world does one technically identify a flight regime? Flight of a helicopter (flight regime) is anticipated by McCool @ c1:35-52. McCool uses a neural network to determine gross weight. Applicant's selection of a neural network is inconsequential since the neural networks were never trained ... a plurality of equivalent neural networks ... functionally indistinguishable from one.

24. In reference to Applicant's argument:

Claim 4 recites, in part, wherein said neural net is one of a plurality of neural nets. As support for disclosing the foregoing feature of Claim 4, the Office Action at page 6 relies on Col. 1, Lines 35-52 of McCool. Applicant cannot find where in this citation of McCool there is any mention to a plurality of neural nets from which one is selected based on the flight regime.

Examiner's response:

Above discussion applies.

25. In reference to Applicant's argument:

Claim 5 recites, in part, wherein said neural net is a feedforward neural net. As support for disclosing the foregoing feature of Claim 5, the Office Action at page 6 relies on Col. 1, Lines 35-52 of McCool. Applicant cannot find where in this citation of McCool there is any mention to a particular type of neural net. If there is a reliance on the feature being inherent within McCool, there must be more than a mere possibility or probability that such a neural network type is used. Based on the teachings in McCool, any one of a variety of different types of neural networks may be used and there is no further teaching in McCool to lead one skilled in the art to conclude that a feedforward neural net was used rather than other possible neural networks.

Examiner's response:

¶ 34. applies. PHOSITA knows that a neural net trained as anticipated by McCool (C1:35-52) is a feedforward neural network. Applicant is invited to review the reference cited in the Office Action of July 14, 2006, page 5, under Examiner's Note.

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26. In reference to Applicant's argument:

Claim 6 recites, in part, wherein said neural net includes a single hidden layer.

As support for disclosing the foregoing feature, the Office Action at page 6 relies on McCool at Col. 3, Lines 8-40. Applicant respectfully submits that there is no mention in McCool regarding any number of hidden layers let alone a single hidden layer as recited in Claim 6. Once again, if the Office Action is relying on inherency as a basis for this rejection, there must be more than a possibility that a single layer is used. Applicant can find no disclosure, suggestion or other basis for concluding that McCool uses a single hidden layer or any particular number of layers.

Examiner's response:

¶ 34. applies. Claim 6 does not limit to just one hidden layer. PHOSITA knows that Perceptrons and other one-layer networks are seriously limited in their capabilities. Hence, McCool's anticipation will of necessity have to have at least one hidden layer. Again, Applicant is invited to review the reference cited in the Office Action of July 14, 2006, page 5, under Examiner's Note.

27. In reference to Applicant's argument:

Regarding the features recited in dependent Claims 7, 8, and 9, recite specific features regarding the neural net. The Office Action at pages 6-7 relies on McCool at Col. 3, Lines 8-40 for disclosing Claims 7 and 8, and Col. 2, lines 32-67 for disclosing Claim 9. Applicant cannot locate where in the foregoing sections of McCool there is any reference to the specific features regarding the interconnections (e.g., Claim 7), the particular activation function used (e.g., Claim 8) or the number of neurons (e.g., Claim 9).

Examiner's response:

¶ 34. applies. PHOSITA knows that given a neural network that is disclosed to perform at the level of McCool's disclosure, the cited features that the applicant disclosed in the claims have been anticipated by McCool and others ... such is fundamental to the concept of technology building on prior art. Again, Applicant is invited to review the reference cited in the Office Action of July 14, 2006, page 5, under Examiner's Note.

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28. In reference to Applicant's argument:

With respect to Claim 16, Applicant could find no citation of McCool set forth in the Office Action regarding where McCool discloses the features of Claim 16.

Examiner's response:

¶ 34. applies. Arguments related to claims 16, 24, 27 and 30 are insufficient and do not merit a response.

29. In reference to Applicant's argument:

Applicant's Claim 48 is neither disclosed nor suggested by McCool in that McCool neither discloses nor suggests at least the features of a system for determining a weight of an aircraft comprising: a regime recognizer that determines a regime indicator in accordance with a portion of said one or more inputs, said regime indicator indicating a light regime associated with a flight state of the aircraft based on said portion of the one or more inputs, ... as set forth in Claim 48. The Office Action at page 12 cites to McCool at Col. 2, Lines 32-67 for disclosing the foregoing features of Claim 48. As set forth above, McCool's processing takes place when the helicopter is hovering. However, McCool is silent regarding how a determination is made regarding when the helicopter is hovering. McCool does not disclose or suggest any means to determine an active regime.

Examiner's response:

¶ 34. applies. First Office Action applies. Above discussions apply. An "active regime" is not part of the limitations of claim 48.

30. In reference to Applicant's argument:

Claim 38, as amended herein, is neither disclosed nor suggested by Smith in that Smith neither discloses nor suggests at least the features of a method of determining a weight of an aircraft comprising:... determining said weight using a Kalman filter wherein said one or more values are used as inputs to said Kalman filter and said Kalman filter produces the weight as an output, as set forth in Claim 38. As pointed out above, Smith discloses use of Kalman filters in connection with his Figures 2 and 3. Smith discloses use of Kalman filters in connection with element numbers 40 and 42 of Figure 2, and element numbers 48 and 52 of Figure 3. However, Smith appears to neither disclose nor suggest producing the weight of the aircraft as an output of any one of the foregoing Kalman filters. Accordingly, Smith does not disclose or suggest the foregoing recited features of Claim 38.

Examiner's response:

¶ 34. applies. First Office Action applies. Claim 38 limits to "determining a weight of an aircraft." There are many weights of an aircraft ... partial, complete, gross, fully loaded, fuel load, equipment load, real loads, static, dynamic, virtual ... and weights associated with models. Applicant is invited to review the First Office Action, page 13, lines 16 and 17.

### ***Examination Considerations***

31. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

32. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

33. Unless otherwise annotated, Examiner's statements are to be interpreted in reference to that of one of ordinary skill in the art. Statements made in reference to the condition of the disclosure constitute, on the face of it, the basis and such would be obvious to one of ordinary skill in the art, establishing thereby an inherent prima facie statement.

34. Examiner's Opinion: ¶¶ 31-33 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

### ***Conclusion***

35. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

36. Claims 1-107 are rejected.

***Correspondence Information***

37 Any inquiry concerning this information or related to the subject disclosure should be directed to the Primary Examiner, Joseph P. Hirl, whose telephone number is (571) 272-3685. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David R. Vincent can be reached at (571) 272-3080.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,  
Washington, D. C. 20231;

Hand delivered to:

Receptionist,  
Customer Service Window,  
Randolph Building,  
401 Dulany Street,  
Alexandria, Virginia 22313,  
(located on the first floor of the south side of the Randolph Building);




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or faxed to:

(571) 273-8300 (for formal communications intended for entry.

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Joseph P. Hirl  
Primary Examiner  
January 4, 2007